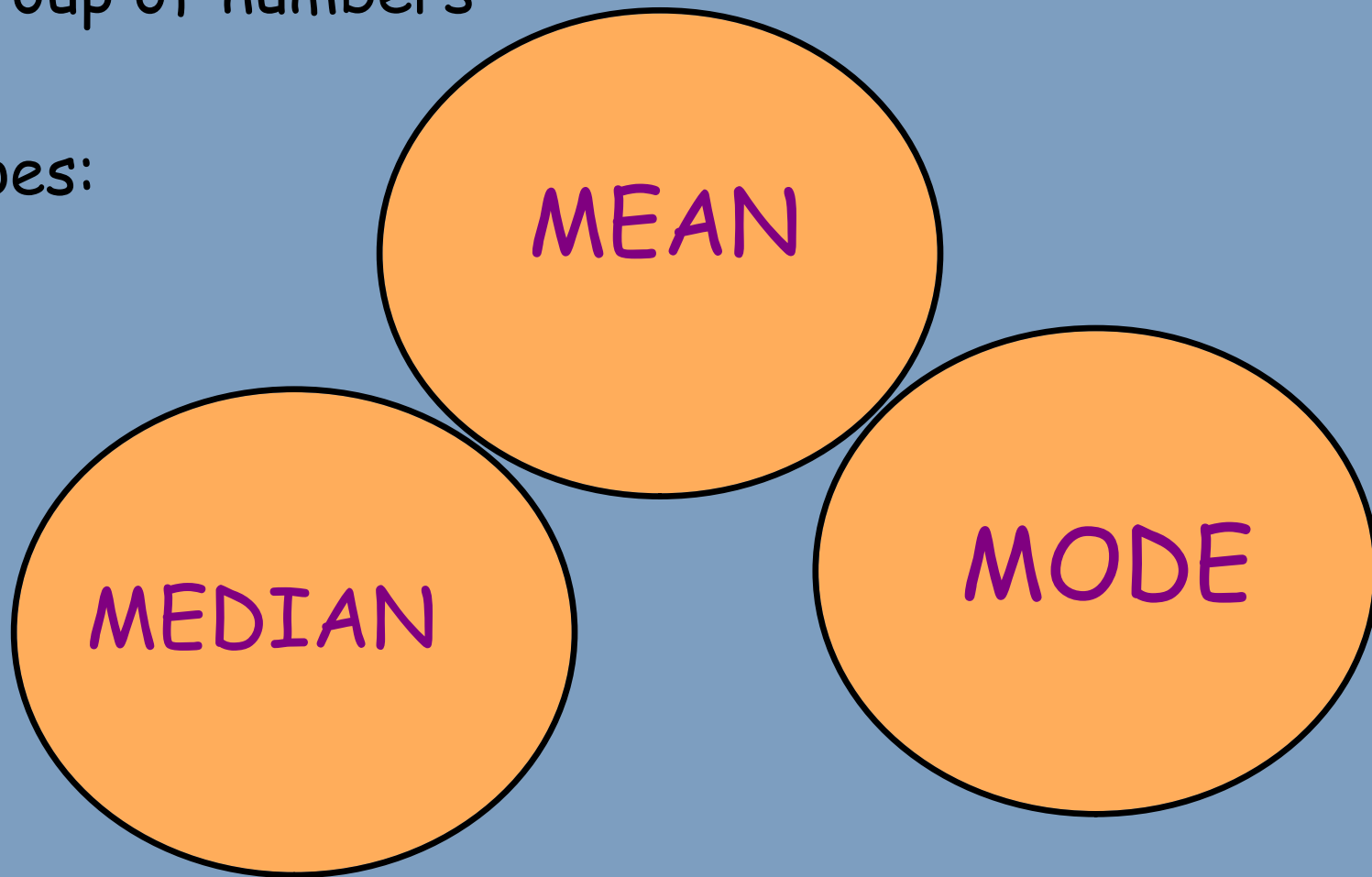


# 1.3 Describing Data

Curriculum Outcomes	Related Activities	Page in Text
<ul style="list-style-type: none"> <li>calculate various statistics using appropriate technology, analyze and interpret the displays, and describe the relationships</li> </ul>	<ul style="list-style-type: none"> <li>review computation and use of mean, median, and mode</li> </ul>	<b>15</b>
	<ul style="list-style-type: none"> <li>determine the best average to use to describe a set of reaction time measurements</li> </ul>	<b>16</b>
<ul style="list-style-type: none"> <li>calculate and apply mean and standard deviation using technology to determine if variation makes a difference</li> </ul>	<ul style="list-style-type: none"> <li>determine data values that can be treated as unusual, or outliers, and look at ways to handle them</li> </ul>	<b>15</b>
	<ul style="list-style-type: none"> <li>explore the limitations of using one piece of information to describe a set of data</li> </ul>	<b>17</b>
<ul style="list-style-type: none"> <li>create and analyze plots using appropriate technology</li> <li>make and interpret frequency bar graphs while conducting experiments and exploring measurement issues</li> </ul>	<ul style="list-style-type: none"> <li>interpret, create, and consider uses, advantages, and disadvantages of different graphs, that is, stem-and-leaf plots, box-and-whisker plots, frequency tables, histograms</li> </ul>	<b>26</b>
	<ul style="list-style-type: none"> <li>consider appropriate data grouping to create histograms</li> </ul>	<b>22</b>
<ul style="list-style-type: none"> <li>analyze statistical summaries, draw conclusions, and communicate results about distributions of data</li> </ul>	<ul style="list-style-type: none"> <li>use the shape of a graph to determine an informal measure of the spread or distribution of the data</li> </ul>	<b>22</b>

# Measures of Central Tendency

- ways to identify one number that characterizes a group of numbers
- Types:



# MODE

- the number that appears most often in a set of data.
- there can be more than one mode in a set of data.

Example:

Find the mode of this group of numbers.

20, 19, 26, 18, 26

Step 1: Arrange the numbers from least to greatest.

18, 19, 20, 26, 26

Step 2: Find the number that is repeated the most.

18, 19, 20, 26, 26

The mode is 26.

# MEAN

- the sum of a set of numbers; divided by the total number of numbers in the set. (average)

- Symbol =  $\overline{x}$

- Equation =  $\overline{x} = \frac{\text{sum of values}}{\# \text{ values}}$        $\overline{x} = \frac{\Sigma}{\# \text{ values}}$

## Example:

Find the mean of the group of numbers:

**7, 11, 12, 18, 23, 25**

Step 1: Add all the numbers.

$$7 + 11 + 12 + 18 + 23 + 25 = 96$$

Step 2: Divide the sum by the number of items.

$$96 \div 6 = 16$$

**The mean is 16.**

# MEDIAN

- the middle value or midpoint of a set of numbers arranged in order

Example:

Find the median of a group of numbers.

20, 19, 23, 18, 26

Step 1: Arrange the numbers from least to greatest.

18, 19, 20, 23, 26

Step 2: Find the middle number.

~~18~~, ~~19~~, 20, ~~23~~, ~~26~~

The median is 20.

What happens when there is 2 middle numbers??

Example:

~~1~~/~~8~~, ~~1~~/~~9~~, 20, 22, ~~2~~/~~3~~, ~~2~~/~~6~~

Step 3: Find the mean of the two middle numbers.

$$20 + 22 = 42$$

$$42 \div 2 = 21$$

The median is 21.

# Outliers

- Values that are significantly different ("lie outside") from the majority of a set of data.
- They can affect the mean.

## Example

What would the outlier of this data be?

4cm, 6cm, 5.3cm, 10.7cm, 3.2cm,  
4.6cm, 6.6cm

The outlier is 10.7cm



# Range

- the smallest number subtracted from the largest number

## Example

What would the range of this data be?

**8, 10, 6, 9, 8, 7**

**Largest = 10**

**Smallest = 6**

$$10 - 6 = 4$$

**The range is 4**

## Homework

COPY THIS DOWN

Find the mode, mean & median for each of the following:

1. 5, 12, 12, 28, 23, 31  
 $\bar{x} = 18.5$   
mode = 12  
median = 17.5

2. 50, 67, 79, 45  
 $\bar{x} = 60.25$   
mode =  
median = 58.5

3. 4, 1, 7, 3, 1, 4, 8, 9, 9  
 $\bar{x} =$

4. 25, 25, 25, 29, 27, 27

## Investigation #2

### p.14

- We are going to do this activity in pairs  
----> don't get into pairs until after we  
have gone over instructions!!

The range is 4

## Purpose

To communicate your reaction time to an event.

Investigation #2

p.14

## Procedure

- Assign one person (A) to hold a ruler straight up and down at the "30 cm" end with the "0 cm" end nearest to the floor
- The other person (B) holds their forefinger and thumb on either side of the ruler at the "0 cm" end.
- Person A drops the ruler without warning for person B to catch between the forefingers and thumb.
- Record, to the nearest millimetre, where the higher edge of the forefinger is on the ruler after the catch.
- Repeat the ruler drops twenty times.
- Switch positions so that person B now drops the ruler and drop the ruler another twenty times.
- RECORD your data in a chart in your book

Each person must make a table similar to this one in their notes

Results	
Drop Number Person A (name)	Catch Height (cm) Person A (name)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Investigation #2  
p.14

# Questions:

Each person must do these questions with their 20 pieces of data

- Complete the following using the chart made for the 20 trials:

Calculate the mean, median, and range of the 20 reaction times

MEAN -> (sum of all the reaction times)/20 =

MEDIAN -> the middle value when all values are lined up least to greatest =

RANGE -> (Maximum value) - (Minimum value) =

- Does your data have any outliers? State why or why not.
- Does your data have a mode(s)?
- Complete questions 1 & 2 on page 15